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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/798,874

03/10/2004

Glenn F. Evans

3382-67148

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26119 7590 02/24/2006

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EXAMINER

AMIN, JWALANT B

ART UNIT

PAPER NUMBER

2676

DATE MAILED: 02/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/798,874

Applicant(s)

EVANS ET AL.

Examiner

Jwalant Amin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 35-46 is/are pending in the application.
- 4a) Of the above claim(s) 6-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 35-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/10/04.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-5 and 35-46, drawn to a method representing chroma and luma information for a pixel in the video image in an n-bit representation, where the n-bit representation is convertible to a lower-precision representation by assigning zero values to one or more of the bits in the least significant byte, classified in class 345, subclass 605.
  - II. Claims 6-10, drawn to a method representing chroma and luma information for a pixel in the video image in an n-bit representation, where the n-bit representation is convertible to a higher-precision representation by changing an identifier for the video data, classified in class 345, subclass 605.
2. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because invention I is drawn to a method for representing chroma and luma information in the video image using n-bit representation, where n-bit representation is convertible to a lower-precision

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representation by assigning zero values to one or more of the bits in the least significant byte. Invention II is representing chroma and luma information in the video image using n-bit representation, where n-bit representation is convertible to a higher-precision representation by changing an identifier for the video data. The combination is direction to the overall method of representing video data in different formats without the specific features required by the method in each subcombination.

3. Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

#### ***Response to Arguments***

4. Applicant's election with traverse of restriction, claims 1-5 and 35-46 from group I in the reply filed on 1/3/2006 is acknowledged. The traversal is on the ground(s) that "there must be a serious burden upon the Examiner if the restriction is not required". This is not found persuasive because having to examine two different inventions together is a serious burden upon the Examiner as the claims from group I and group II have divergent subject matter. The claims of group I and II have divergent subject matter because group I relates to converting the n-bit representation to a lower-precision representation and group II relates to converting the n-bit representation to a higher-precision representation.

The requirement is still deemed proper and is therefore made FINAL.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3, 5, 35, 39-41 and 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eid et al. (US Pub. No.: 2004/0190771; hereinafter referred to as Eid).

7. Regarding claim 1, Eid teaches a method of representing video data for a video image, the method comprising representing chroma and luma information for a pixel in the video image in an n-bit representation ([0001], [0005] line 4-5; motion picture corresponds to video image; image data/motion picture data corresponds to video data for a video image; luminance and chrominance corresponds to chroma and luma information; each pixel ... luminance and chrominance corresponds to representing chroma and luma information for a pixel; represented using a number of bits/representation uses m bits corresponds to n-bit representation), the n-bit representation comprising a 16-bit fixed-point block of data for the pixel ([0005] lines 1-5, [0006] lines 1-2; representation uses m bits corresponds to n-bit representation; this representation uses 16 bits corresponds to 16-bit representation; a fixed point integer color component representation corresponds to fixed-point block of data), where the most significant byte in the 16-bit unit of data is an integer component, where the least significant byte in the 16-bit unit of data is a fractional component ([0005] lines 4-5, [0006] lines 1-2, [0007]

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last four lines; representation uses m bits/this representation uses 16 bits corresponds to 16-bit representation; n-bit integer part/n most significant bits representing a signed integer corresponds to the most significant bits in unit of data is an integer component; k-bit fractional part/k least significant bits representing a fractional part corresponds to least significant bits in the unit of data is a fractional component), and where the n-bit representation is convertible to a lower-precision representation by assigning zero values to one or more of the bits in the least significant byte ([0023] lines 4-6; 16-bit integer corresponds to n-bit representation; 10-bit value corresponds to lower-precision representation; shifting corresponds to assigning zero values; shifted by 6 bits corresponds to assigning zero values to one or more of the bits in the least significant byte; the 16-bit ... to obtain a 10-bit value corresponds to n-bit representation is convertible to a lower-precision representation).

Eid discloses all of the claimed limitations as stated above, but does not explicitly teach that the most significant byte forms an integer component and the least significant byte forms a fractional component. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the numbers 'n' and 'k' such that 'n' most significant bits would be same as the most significant byte and 'k' least significant bits would be same as the least significant byte so as to make the '8' most significant bits as the integer component and the '8' least significant bits as the fractional component because such a representation could also be used in the systems with 8-bit processors by using just the integer component of the representation.

8. Regarding claim 2, Eid teaches the  $n$ -bit representation is a 16-bit representation and the lower-precision representation is a 10-bit representation ([0023] lines 4-6; 16-bit integer corresponds to  $n$ -bit representation; 10-bit value corresponds to lower-precision representation).

9. Regarding claim 3, Eid teaches converting the  $n$ -bit representation to an  $(n-m)$ -bit representation by assigning zero values to the  $m$  least-significant bits in the least-significant byte ([0023] lines 4-6; 16-bit integer corresponds to  $n$ -bit representation; 10-bit value corresponds to  $(n-m)$ -bit representation; shifting corresponds to assigning zero values; shifted by 6 bits corresponds to assigning zero values to  $m$  least significant bits; the 16-bit ... to obtain a 10-bit value corresponds to converting the  $n$ -bit representation to an  $(n-m)$ -bit representation by assigning zero values to the  $m$  least-significant bits in the least-significant byte).

10. Regarding claim 5, Eid teaches a computer-readable medium having computer-executable instructions stored thereon for performing the method of representing video data for a video data image ([0028]; a memory system stores data corresponds to a computer-readable medium having instructions stored; application program corresponds to instructions; an application program to be executed by the microprocessor corresponds to computer-executable instructions).

11. Regarding claim 35, Eid teaches the  $n$ -bit representation is a 16-bit representation, and the  $(n-m)$ -bit representation is a 10-bit representation ([0023] lines 4-6; 16-bit integer corresponds to  $n$ -bit representation; 10-bit value corresponds to  $(n-m)$ -bit representation).

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12. Regarding claim 39, Eid teaches one or more alpha values are associated with the video image ([0001], [0023] lines 6-7; values for alpha components corresponds to one or more alpha values; values for alpha ... 16-bit format corresponds to one or more alpha values are associated with the video image; motion picture data/image data corresponds to video image).

13. Regarding claim 40, Eid teaches a computer system ([0025] lines 1-3; general purpose computer system corresponds to computer system) comprising at least one memory containing chroma and luma information for at least one pixel in a video image, the chroma and luma information in an n-bit representation ([0001], [0005] line 4-5, [0028] lines 4-5; memory system corresponds to at least one memory; data/luminance and chrominance corresponds to chroma and luma information; each pixel ... luminance and chrominance corresponds to representing chroma and luma information for a pixel; motion picture corresponds to video image; image data/motion picture data corresponds to video data for a video image; represented using a number of bits/ representation uses m bits corresponds to n-bit representation), the n-bit representation comprising a 16-bit fixed point block of data for the pixel ([0005] lines 1-5, [0006] lines 1-2; representation uses m bits corresponds to n-bit representation; this representation uses 16 bits corresponds to 16-bit representation; a fixed point integer color component representation corresponds to fixed-point block of data), where the most significant byte in the 16-bit unit of data is an integer component, where the least significant byte in the 16-bit unit of data is a fractional component ([0005] lines 4-5, [0006] lines 1-2, [0007] last four lines; representation uses m bits/this representation uses 16 bits corresponds



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to 16-bit representation; n-bit integer part/n most significant bits representing a signed integer corresponds to the most significant bits in unit of data is an integer component; k-bit fractional part/k least significant bits representing a fractional part corresponds to least significant bits in the unit of data is a fractional component), and where the n-bit representation is convertible to a lower-precision representation by assigning zero values to one or more of the bits in the least significant byte ([0023] lines 4-6; 16-bit integer corresponds to n-bit representation; 10-bit value corresponds to lower-precision representation; shifting corresponds to assigning zero values; shifted by 6 bits corresponds to assigning zero values to one or more of the bits in the least significant byte; the 16-bit ... to obtain a 10-bit value corresponds to n-bit representation is convertible to a lower-precision representation); and one or more processing units operable to process the chroma and luma information for the at least one pixel in the video image ([0028] lines 5-7, [0029] lines 7-11; microprocessor/multiprocessor computer system corresponds to one or more processing units; data/application program/computer program instructions corresponds to chroma and luma information; an application program to be executed by the microprocessor/various steps ... multiprocessor computer system corresponds to one or more processing units operable to process the chroma and luma information).

Eid discloses all of the claimed limitations as stated above, but does not explicitly teach that the most significant byte forms an integer component and the least significant byte forms a fractional component. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the numbers 'n' and

'k' such that 'n' most significant bits would be same as the most significant byte and 'k' least significant bits would be same as the least significant byte so as to make the '8' most significant bits as the integer component and the '8' least significant bits as the fractional component because such a representation could also be used in the systems with 8-bit processors.

14. Regarding claim 41, the statements presented above, with respect to claim 2 and claim 40, are incorporated herein.

15. Regarding claim 45, the statements presented above, with respect to claim 39 and claim 40, are incorporated herein.

16. Regarding claim 46, Eid teaches the computer system further comprising a display ([0025] lines 3-5; output device that displays corresponds to a display).

17. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eid as applied to claim 1 above, and further in view of Lundberg et al. (US Pub. No.: 2004/0183949; hereinafter referred to as Lundberg).

18. Regarding claim 4, Eid discloses all of the claimed limitations as stated above, except that the chroma information is sampled at a resolution less than the luma information. However, Lundberg teaches the digital video in YCbCr format is chroma sub-sampled ([0073]; luminance values corresponds to luma information; chrominance values/colour information corresponds to chroma information; lower spatial resolution corresponds to at a resolution less than; chroma is sub-sampled ... than the luminance corresponds to the chroma information is sampled at a resolution less than the luma information). Therefore, it would have been obvious to one of ordinary skill in the art at

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the time the invention was made to sample the colour information at lower resolution than the luminance as taught by Lundberg and use such sampling into the method of Eid because human eye is more sensitive to variations in luminance than in chrominance ([0078]).

19. Claims 38 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eid, and further in view of FOURCC.org – YUV pixel formats (FOURCC.org – YUV pixel formats, <http://www.fourcc.org/yuv.php>, pages 1-15; hereinafter referred to as FOURCC.org).

20. Regarding claims 38 and 44, Eid discloses all of the claimed limitations as stated above, except that the n-bit representation and the (n-m)-bit representation are associated with different FOURCC codes. However, FOURCC.org teaches different FOURCC codes for packed YUV formats with different bits per pixel. The labels IYU1 and IYU2 represent 12-bit and 24-bit mode 2 of the IEEE 1394 Digital Camera 1.01 spec format with different FOURCC codes (page 2; IYU2 with 24 bits per pixel corresponds to n-bit representation; IYU1 with 12 bits per pixel corresponds to (n-m)-bit representation/lower-precision representation). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use different FOURCC codes with n-bit representation and (n-m)-bit representation as taught by FOURCC.org and use it into the method of Eid because using different codes would easily help to identify the different formats used for component representation by looking at the FOURCC codes.

21. Claims 36-37 and 42-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eid, and further in view of Reitmeier et al. (US Pub. No.: 2003/0202589; hereinafter referred to as Reitmeier).

22. Regarding claims 36 and 37, Eid discloses all of the claimed limitations as stated above, except that the method comprises processing data in the (n-m)-bit representation using (n-m)-bit hardware, and that the (n-m)-bit representation comprises a 10-bit processor. However, Reitmeier teaches to process 10-bit video signal by coupling it to a video processor ([0033] lines 6-8; 10-bit video signal corresponds to data in the (n-m)-bit representation; video processor corresponds to hardware; 10-bit video ... to a video processor for further processing corresponds to processing data using (n-m)-bit hardware). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use 10-bit video processor as taught by Reitmeier into the method of Eid because this would help to reduce the cost of processing data by utilizing all the bits available and not wasting any unused bits.

23. Regarding claim 42, Eid teaches one or more processing units ([0028] lines 5-7, [0029] lines 7-11; microprocessor/multiprocessor computer system corresponds to one or more processing units), and wherein the 16-bit representation is converted to a 10-bit representation by assigning zero values to 6 least-significant bits in a least-significant byte ([0023] lines 4-6; 16-bit integer corresponds to 16-bit representation; 10-bit value corresponds to 10-bit representation; shifting corresponds to assigning zero values; shifted by 6 bits corresponds to assigning zero values to m least significant bits; the 16-bit ... to obtain a 10-bit value corresponds to converting the 16-bit representation to an

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10-bit representation by assigning zero values to the 6 least-significant bits in the least-significant byte).

Eid discloses all of the claimed limitations as stated above, except that at least one of the one or more processing units is a 10-bit processing unit. However, Reitmeier teaches to process 10-bit video signal by coupling it to a video processor ([0033] lines 6-8; 10-bit video signal corresponds to data in 10-bit representation/number of bits in the lower-precision representation; video processor corresponds to processing unit; 10-bit video ... to a video processor for further processing corresponds to 10-bit processing unit). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use 10-bit video processor as taught by Reitmeier into the method of Eid because this would help to reduce the cost of processing data by utilizing all the bits available and not wasting any unused bits.

24. Regarding claim 43, the statements presented above, with respect to claims 40 and 42, are incorporated herein.


25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jwalant Amin whose telephone number is 571-272-2455. The examiner can normally be reached on Monday - Friday 9:30 a.m. - 6:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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